SEMI-RECUMBENT CYCLE AND SEMI-RECUMBENT CYCLE CLINICAL PRO

INSTALLATION/ OPERATION MANUAL

950-120
950-121
950-122
950-124
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950-127

BIODEX
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SEMI-RECUMBENT CYCLE

This manual covers installation and operation procedures for the following Semi-Recumbent Cycle products:

#950-120	Semi-Recumbent Cycle, 115V
#950-121	Semi-Recumbent Cycle, 230V
#950-122	Semi-Recumbent Cycle, Clinical Pro, 115V
#950-124	Semi-Recumbent Cycle, Clinical Pro, 100V
#950-126	Semi-Recumbent Cycle, Japanese, 100V
#950-127	Semi-Recumbent Cycle, Clinical Pro, Japanese, 100V

NOTE: All or some of the following symbols, cautions, warnings and notes may apply to your Semi-Recumbent Cycle and correspond to this operation manual:

Symbol	***Meaning***
⚠	*Attention, consult accompanying documents.*
⚠	*Symbol signification: Attention, se référer à la notice.*
⚠	*Warning: Injuries to health may result from incorrect or excessive training.*
⚠	*Attention, incorrect ou extrême entrainement peut aboutir des lesíons au santé.*

NOTE: Circuit diagrams for this product are available upon request.

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1. INTRODUCTION

Designed for versatility and durability, the Biodex Semi-Recumbent Cycle (SRC) and Semi-Recumbent Cycle Clinical Pro meets the demands of orthopedic, cardiopulmonary, sports medicine, wellness and general conditioning programs. Featuring a work range of 10 to 600 watts, plus self-powered, self-charging capability, these cycles accommodate a wide variety of patient profiles and can be used virtually anywhere. They are especially well-suited for treating weak or deconditioned persons who cannot, or should not, use a standard cycle.

The Biodex SRC and SRC Clinical Pro cycles feature two modes of exercise operation: Isokinetic Speed Control and Constant Power Effort Control. Because the internal battery is automatically recharged when work rates reach or exceed 30 watts and 50 RPM, the cycles can be used in the gym, at the clinic or on the sidelines – without cumbersome power cords. An AC adapter is provided for use at work rates below 30 watts and 50 RPMs. Large wheels make these cycles easy to move.

Ergonomically designed and simple to operate, the Semi-Recumbent Cycles features a step-through design that makes it easy for cyclists – including those with limited mobility – to get into and out of the exercise position. The contoured seat with lumbar support and an indexed track allows extensive front-to-back adjustment to ensure comfort, safety and biomechanically correct positioning. The seat can also be removed quickly for easy wheelchair access. A narrow pedal spread and sturdy grab handle helps cyclists attain and maintain proper positioning for efficient operation. The SRC accommodates users from 4'6" to 6'10" and weighing up to 350 pounds.

The easy-to-read, programmable LED display provides immediate user biofeedback for increased motivation and compliance, maintaining all settings and LED displays for 60 seconds after the workout is finished. Users can choose from quick-start operation that gets first-time cyclists right into their exercise routine, or from five pre-programmed exercise profiles for each mode of operation. All profiles can be modified with the panel controls to provide a multitude of exercise programs to suit any individual's need.

The SRC Clinical Pro incorporates all of the above, plus a wider, rotating seat, cardiac monitoring and adjustable pedal cranks.

NOTE: *The SRC battery is shipped without the battery charged. Please plug in the AC Adapter and use the SRC with the battery charger connected during the first 24 hours of use. It is not required to keep the charger connected if work rates will exceed 30 watts on a regular basis, which is sufficient to charge the battery. To use the SRC at work rates below 30 watts the AC Adapter is required.*

2. PARTS AND ADJUSTMENTS

(Refer to Figure 1.)

Figure 1: The Biodex Semi-Recumbent Cycle Clinical Pro parts and adjustment mechanisms. The Semi-Recumbent Cycle parts and adjustment are similar except for having a standard pedal with adjustable footstrap and no seat rotation.

1. Display Panel
2. Contact Heart Rate Contact Handgrips
3. Fixed Support Handles
4. Seat Front-to-Back Release Handle
5. Seat Front-to-Back Scale
6. Adjustable Pedal Cranks (Clinical Pro only)
7. Battery Recharge Jack
8. RS-232 Jack
9. Rear Seat Stop (removable for wheelchair use)
10. Seat Rotation Handle (Clinical Pro only)

The Biodex SRC is easy to adjust for patient comfort. The seat can be moved forward or back and the pedal straps can be tightened or loosened for a comfortable and secure fit. The following section explains how to adjust your bike for optimum patient comfort and positioning.

Seat Front-to-Back Adjustment: The seat can be moved forward or back over a range of 20" to match user comfort requirements. Proper seat front-to-back positioning will allow the user to pedal comfortably while maintaining the lordotic curve.

To adjust the seat front-to-back position:

- Pull out on the Seat Front-to-Back Release Handle. While holding the handle out, slide the seat either forward or back to the desired position. To lock the seat in position, release the handle and make sure it engages in the appropriate hole. To ensure reproducible positioning, note the seat position as per the Seat Front-to-Back Position Scale, located on the seat slide track.

Pedal Foot Strap Adjustment: The Pedal Foot Strap can be adjusted to fit any foot or shoe.

To adjust the foot strap:

- Free the foot strap for adjustment by pulling the strap down and over the rubber catch. To secure the strap, pull the desired hole over the rubber catch from the bottom up.

Seat Removal: The seat can be removed for wheelchair use.

- Loosen the rear seat stop.
- Pull out on the seat front-to-back release handle and slide the seat off the back of the trolly. You can now easily position a wheelchair patient for exercise.

NOTE: *Do not sit on seat when removed.*

Rotating Seat (Clinical Pro only): To aid the user in getting on and off the Semi-Recumbent Cycle Clinical Pro, an optional rotational seat can be turned left or right.

To rotate the seat:

- Pull forward on the Seat Rotation Handle to release the seat. You may now swivel the seat left or right until it engages in either position.
- With the seat locked in the desired position, instruct the patient to sit down. Pull out on the Seat Rotation Handle and rotate the seat until it engages in the forward locked position.

Adjustable Pedal Cranks (Clinical Pro only): The optional Adjustable Pedal Cranks can be set to accommodate or define a knee arc to avoid a painful point in the user's range of motion, or to protect reconstructed ligaments.

To adjust the pedal crank position:

- Loosen the Pedal Adjust Lever by turning it in a counterclockwise direction.
- Pull out on the Pedal Adjust Pull Pin and, while holding it out, slide the pedal to the desired position.
- Release the Pedal Adjust Pull Pin and ensure that it locks into the appropriate pedal shaft detente.
- Tighten the Pedal Adjust Lever by turning it in a clockwise direction. (Be sure to position the lever so it will not interfere with user exercise. To do this, simply pull out on the lever handle and turn it to the desired position.)

Adjustable Pedal Cranks (Clinical Pro only):
Adjustable pedal cranks can be used to allow patients with limited knee flexion to begin their cycling program earlier. Standard pedal crank lengths typically require 110 to 115 degrees of knee flexion to complete full pedal revolutions. Adjustable pedal cranks let patients perform complete revolutions with as little as 80 to 90 degrees of flexion. These pedal cranks also provide a means for establishing knee flexion limits to avoid painful points in the patient's range of motion, or to protect reconstructed ligaments.

3. QUICK-START OPERATION

Although the SRC offers advanced programming capability, it also features a "Quick-Start" function that allows the user to immediately begin cycling with factory preset default values serving for the programmable system parameters.

Quick-Start operation is simple. Seat the user, adjust the seat forward and back position and foot pedal straps as necessary, and proceed as described below:

1. Press <Power On> to power-up. After a brief self-test (which includes display of the current software version,) the system beeps to signify that it is ready to begin collecting data.

2. Grasp the SRC fixed handlebars (or optional heart rate handgrips) and begin pedaling.

3. Use the <+> and <-> buttons to adjust effort level (#5 at bottom of the display).

To stop the system at any time, simply stop pedaling. All parameters will continue to display for one minute before the system shuts off. If you want to turn the system off and automatically reset the display, press <Power ON > again.

NOTE: *Standard SRC's default to Constant Power Effort Control exercise mode. SRC Clinical Pro's outfitted with retro-cycling default to Isokinetic exercise mode. A green LED on the display activates to show the selected mode. To change modes, press <Select Exercise>(4) at the bottom of the display.*

NOTE: *To provide heart rate monitoring (SRC Clinical Pro only), the subject must hold onto both heart rate contact handgrips.*

NOTE: *For the first 24 hours of operation, the SRC should be used with the AC Adapter.*

4. BASIC OPERATION

(Refer to Figure 2.)

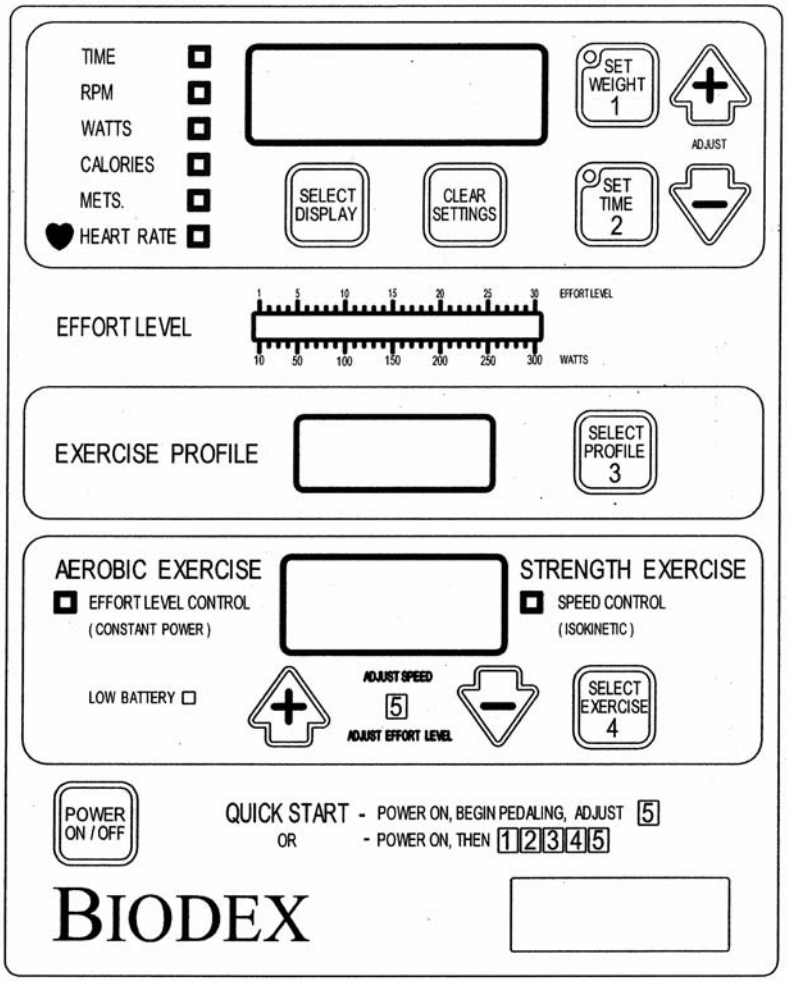


Figure 2. The Biodex Semi-Recumbent Cycle Display Panel.

Quick-Start mode is perfect for acquainting subjects with the Biodex Semi-Recumbent Cycle. It gets the user up and pedaling in about five seconds. More experienced users, however, will likely prefer the ability to personalize their exercise or rehabilitation routine as described below.

With the system turned ON, seat the user, adjust the seat forward and back position and foot pedal straps as necessary, and proceed as follows:

NOTE: *Steps one through five, below, correspond to the numbered keys on the display.*

1. Set The Patient Weight: Press <Set Weight> and then use the <+> or <-> arrow keys to adjust the value to the desired setting (for more accurate metabolic calculation).

2. Set the Exercise Duration Time: Press <Set Time> and then use the <+> or <-> arrow keys to adjust the value to the desired setting.

   NOTE: *Time counts down if you set the exercise duration. Time counts up if you do not set this value.*

3. Select the Desired Profile: By pressing <Select Profile>, you can scroll through the available profiles. When you see the profile desired, proceed to step 4.

4. Select the Exercise Mode: Press <Select Exercise> to toggle between Isokinetic (strength exercise/speed control) and Aerobic Exercise (constant power/effort control).

5. Adjust Isokinetic Speed or Constant Power Effort Level: Use the <+> or <-> arrows to adjust the Isokinetic speed or constant power effort level to the desired level.

   NOTE: *To make changes to programmed parameters, press <Clear Settings>. This will set all parameters back to default values. You can then begin again at step one, above.*

6. Grasp the SRC fixed handlebars or heart rate contact handgrips, and begin pedaling.

NOTE: *The Biodex Semi-Recumbent Cycle begins collecting data as soon as the subject begins to pedal. Once data collection begins, the system scrolls through the settings at the top left side of the display panel. To lock on to a specific setting, i.e., calories, press <Select Display> until you advance to the setting you wish to be displayed. To return to a scrolling display format, press and hold <Select Display> for two full seconds.*

NOTE: *Standard SRC's default to Constant Power Effort Control exercise mode. SRC Clinical Pro's outfitted with retro-cycling default to Isokinetic exercise mode. A green LED on the display activates to show the selected mode. To change modes, press <Select Exercise> (4) at the bottom of the display.*

NOTE: *To provide heart rate monitoring (SRC Clinical Pro only), the subject must hold onto both heart rate contact handgrips.*

NOTE: *For the first 24 hours of operation, the SRC should be used with the AC Adapter.*

5. DISPLAY PARAMETERS

The top window of the display panel offers readouts for common parameters of exercise and training interest. These parameters listed on the left side of the top section of the display and include Time, Revolutions Per Minute (RPM), Watts, Calories, METS and Heart Rate (optional). As you pedal, the system displays values for each parameter in the display window. A green indicator light denotes the parameter currently being displayed.

A low-battery LED is located at the bottom left of the display. This indicator illuminates if the battery needs to be recharged. To recharge the battery, simply plug the input jack of the recharging pack into the receptacle at the front of the cycle base. Plug the opposite end of the recharging pack into a wall socket. The system will recharge even while turned OFF.

NOTE: *The SRC has a Time-Out function based on the system clock. If left on without being used for more than 60 seconds, the SRC automatically turns OFF and all data is lost. For this reason, it is important to check all accumulated data immediately following any exercise session.*

NOTE: *An explanation of METs, and the relationship of calories burned to oxygen consumption and METs, is provided in chapter 9, Clinical Considerations.*

6. SELECTING THE RESISTANCE MODE

The Biodex SRC provides two modes of operation: Constant Power Effort Control and Isokinetic Speed Control. Either mode is selected using the <Select Exercise> (4) key. Standard SRC's default to Constant Power Effort Control while SRC Clinical Pro's with optional retro-cycling default to Isokinetic Speed Control. Pressing the <Select Exercise> key will let you toggle between the two choices. An LED illuminates next to the current selection. The Constant Power Effort Level or Isokinetic Speed selected are displayed in the exercise window at the bottom of the display. Effort level and WATTS are also displayed in the effort level display bar.

NOTE: *Although the effort level display bar shows up to 300 watts, the LED display will show up to 600 watts.*

NOTE: *Work rates of 30 to 600 watts can be achieved without using the AC adapter when above 30 watts and 50 RPM. Using the AC adapter will allow users to achieve work rates as low as 10 watts at 25 rpm.*

CONSTANT POWER EFFORT CONTROL (AEROBIC EXERCISE)

- Resistance automatically changes as pedal speed changes to maintain intended effort level
- Excellent for heart rate and pulmonary rehab where work rate compliance is priority
- Popular for general aerobic conditioning

Constant Power Effort Control is ideal for cardiovascular and general aerobic exercise. In this mode, subjects can pedal as fast or as slow as they wish. The catch is that the slower one pedals, the greater the resistance encountered. That's because Constant Power Effort Control provides for a preset, fixed power (PWR) output with variable speed and variable resistance.

Using Constant Power Effort Control, no matter how fast or slow the subject pedals the same amount of work must be produced. To ensure this, the SRC instantaneously varies pedaling resistance to match the effort of the user as measured in pedal revolutions per minute. Increase the pedal RPM's and the SRC responds by decreasing resistance. Decrease RPM's and increased pedaling resistance will be the result. In short, work rate remains constant regardless of pedal RPM speed.

When Constant Power Effort Control is selected, effort level is displayed in the Effort Level Display Window and Effort Level Display Bar. A selection of 15 effort levels provides a wide range of work-rate choices. Weak, de-conditioned, or post-operative patients, for example, can exercise at work rates as low as 10 watts. Stronger subjects can demand as much as 300 watts.

Because a known work rate can be set, Constant Power Effort Control is extremely valuable in the later stages of orthopedic rehabilitation and for performance training.

ISOKINETIC SPEED CONTROL (STRENGTH EXERCISE)

- Speed is always constant and resistance is accommodating
- Pedal hard, work rate increases. Pedal easy, work rate decreases
- Excellent for strengthening and building endurance
- Popular for sport training

Isokinetic Speed Control provides accommodating resistance throughout the subject's entire pedaling range of motion for the duration of the exercise period. Resistance continuously matches effort, accommodating to variations in the subject's force output due to weakness or pain at specific points in the range of motion, and to fatigue over the course of the cycling period. With a selection of 20 speeds (25 to 120 deg/sec), Isokinetic Speed Control can be used to maximize strength gains while minimizing the potential for injury. The default Isokinetic speed setting is 60 rpm. Isokinetic workrate can reach 600 watts at 120rpm.

As subjects pedal with Isokinetic Speed Control, they will quickly notice that you can go only so fast. Once the selected speed is reached, increasing effort results in increased pedaling resistance - try as they might, subjects can't pedal any faster. On the other hand, if effort is lessened, the pedaling resistance will decrease. This reflects the basic premise of Isokinetic exercise: fixed speed with totally accommodating, variable resistance.

Just what is "totally accommodating, variable resistance?" Simply put, this means that at any point in the range of motion (in this case, the pedaling revolution) the resistance encountered by the user will exactly match the force exerted. In other words, the harder one pushes on the pedal, the greater the resistance. Maximum speed never changes and there is little or no resistance provided until the preset speed is achieved.

Because the SRC provides totally accommodating Isokinetic resistance for each and every pedaling revolution, fluctuations in force output are instantaneously accommodated. Since the amount of resistance the musculoskeletal system must overcome can never exceed that which it can produce at any point in the range of motion, the Isokinetic mode ensures extremely safe and comfortable exercise for rehabilitation users.

7. SELECTING AND CUSTOMIZING EXERCISE PROFILES

The Biodex Semi-Recumbent Cycle features five pre-programmed exercise protocols. These can be used in conjunction with over 30 effort levels for Constant Power Effort Control or 20 speed settings for Isokinetic Speed Control applications.

Each pre-programmed exercise protocol can be used as is, or can be customized by changing the weight, time, speed or effort level values. Modifying the <Set Time> (2) value changes the total time and the duration of each interval. Changing the Set Speed or Effort Level (5) increases or decreases each interval. The minimum time for each profile is six minutes.

During the exercise, actual patient effort in WATTS is displayed on the Effort Level Bar Graph. The selected program effort level or speed is displayed in the Exercise Window.

The Effort Level Bar Graph provides both clinician and user with immediate, real-time biofeedback, which helps make it easy for the user to stay within personal protocol guidelines and for the clinician to be aware of the user's level of effort.

The following sections define each exercise protocol and its potential applications.

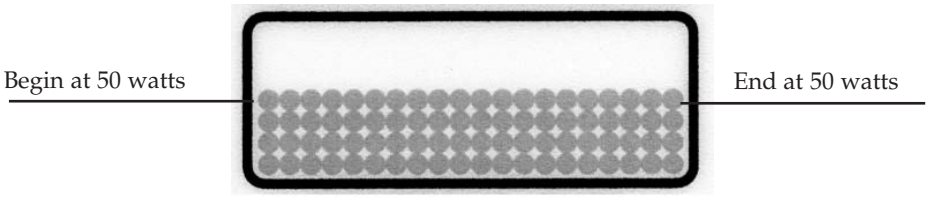
CONSTANT POWER EFFORT PROFILE EXAMPLES
All segments of the Constant Power Profiles are based on the work rate entered for the peak work rate when you set Adjust Effort Level (#5). For example, if you enter "5" (50 WATTS) as the Peak Effort Level, the Constant Power (Manual Mode) profile will remain at "5" (50 WATTS) for the duration of the exercise session.

Minimum time for all profiles = 6 minutes.

Examples

With a Peak Effort Level of "5" (50 WATTS), a Constant Power (Manual Mode) Profile will appear like the following example:

Peak Effort Level: 5 (50 WATTS)

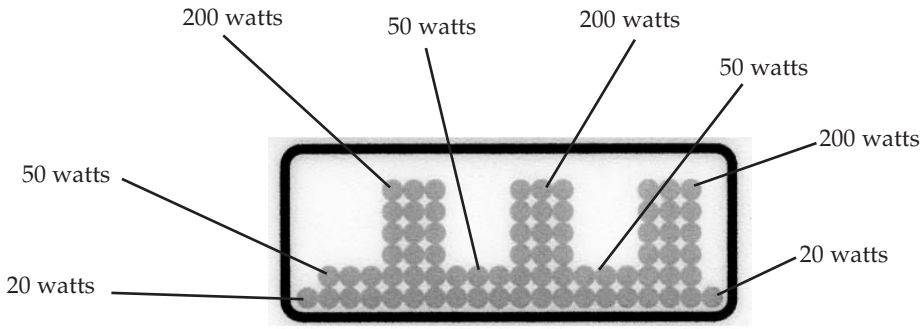


With a Peak Effort Level of "20" (200 WATTS), a Constant Power Aerobic Interval Training Profile will appear like the following example. (Refer to next page for profile definition):

Peak Effort Level: 20 (200 WATTS)

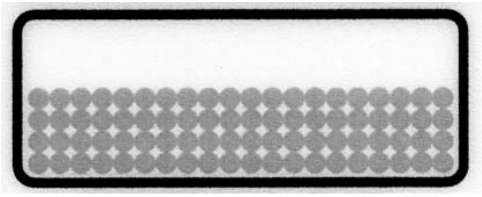
Warm Up at 20 WATTS (200 x 10%)
Initial Low = 50 WATTS (200 x 25%)*
First High = 200 WATTS (Peak Effort Level)
Second Low = 50 (200 x 25%)
Second High = 200 WATTS (Peak Effort Level)
Third Low = 50 WATTS (200 x 25%)
Third High = 200 WATTS (Peak Effort Level)
Cool Down = 20 WATTS (200 x 10%)*

*All values for Constant Power are rounded to the nearest unit of 10.



CONSTANT POWER EFFORT PROFILES DEFINED

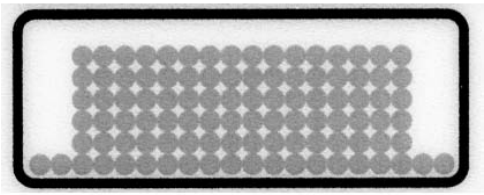
Constant Power (Manual Mode)



Effort level is consistent for the duration of this profile. The user selects the peak effort level and simply begins to pedal.

- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal

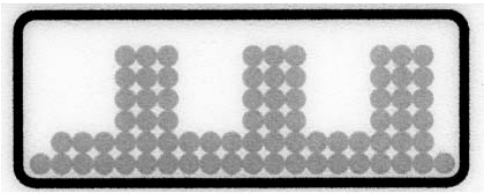
Constant Effort Level with Warm-Up and Cool Down



The starting segment (1, warm-up) and ending segment (3, cool down) are set at 25% of selected peak effort level or the minimum effort for the first three segments produced in the effort bar, whichever is greater. The middle segment (2, work) is set at the peak effort level selected by the user.

- Includes a warm-up and cool down period
- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal

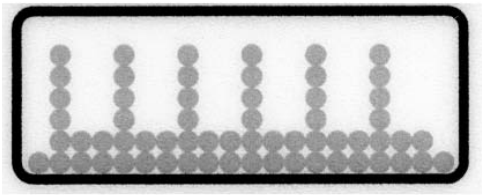
Aerobic Interval Training



The starting segment (1, warm-up) and ending segment (8, cool down) are set at 10% of selected peak effort level or the minimum effort for the first three segments produced in the effort bar, whichever is greater. (1,8). Low level segments, (2,4,6) are set at 25% of selected peak effort. High level segments, (3,5,7) are the selected peak effort level.

- Warm-up followed by three intervals of high effort, then low effort
- Low intervals are 25% of high effort level
- For improving aerobic capability or if extremity circulation problems are experienced
- Exercise at upper end of target zone to a moderate level of fatigue at each interval

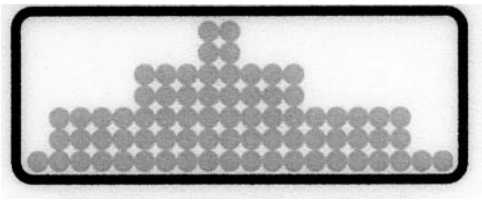
Anaerobic Interval Training



The starting segment (1, warm-up) and ending segment (14, cool down) are set at 10% of selected peak effort level or the minimum effort for the first three segments produced in the effort bar, whichever is greater. Low level segments, (3,5,7,9,11,13) are set at 25% of selected peak effort. High level segments, (2,4,6,8,10,12) are the selected peak effort level.

- Warm-up followed by six short intervals of high-level effort
- Low intervals are 25% of high effort
- For improving strength and endurance – mimics sport conditions of short, intense effort followed by longer recovery periods

Pyramid



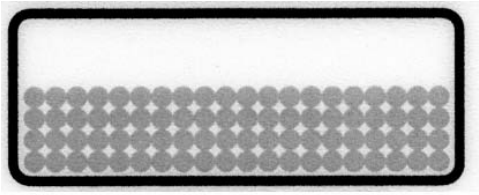
The starting segment (1, warm-up) and ending segment (7, cool down) are set at 25% of selected peak effort level or the minimum effort for the first three segments produced in the effort bar, whichever is greater. Segments 2 and 6 are set at 65% of selected peak effort level while segments three and five are set at 85% of selected peak effort level.

- Warm-up followed by three increasingly difficult intervals, then two less difficult intervals
- Peak effort is the set effort
- Less difficult intervals are 85% and 65% of peak effort
- Use for general conditioning of both aerobic and anaerobic systems

ISOKINETIC PROFILES DEFINED

Minimum time is six minutes for all profiles, target effort level LED will flash during time duration for that segment. All segments following warm up are based on the actual work rate performed in the immediate previous segment.

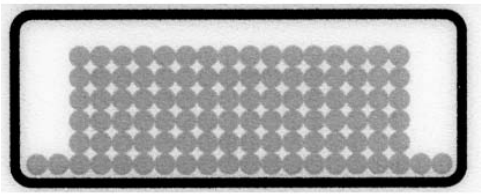
Constant Power (Manual Mode)



Speed is consistent for the duration of this profile. The user selects the speed and simply begins to pedal. Effort level is how hard the patient pushes against the pedal.

- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal

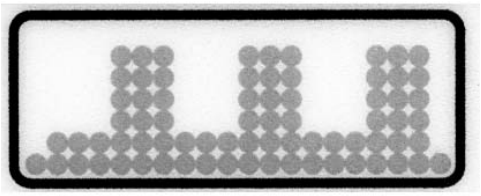
Constant Level with Warm up and Cool Down



The starting segment (1, warm-up) is however hard the patient chooses to work. The middle segment (2, work) target value equals 100% more than the average actual work rate performed in the warm-up segment (rounded to the nearest 10 watts). Target effort level flashes in the effort bar during the time duration for the work segment. The cool down segment equals 50% less than work performed in the work segment.

- Includes a warm-up and cool down period
- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal

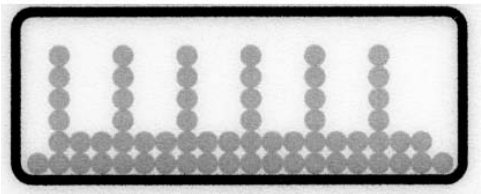
Aerobic Interval Training



1. The starting segment (1, warm-up) is however hard the patient chooses to work.
2. Initial Low level equals 25% more than the average actual work rate performed in the warm-up segment.
3. First High level equals 100 % more than the average actual work rate performed in the initial low level.
4. Second Low level: Equals 50 % less then the average actual work rate performed in the First High Level work segment.
5. Second High Level work segment equals 100 % more than the average actual work rate performed in the Second Low Level.
6. Third Low equals 50 % less then the average actual work rate performed in the Second High Level work segment.
7. Third High Level equals 100 % more than the average actual work rate performed in the Third Low level.
8. Cool Down equals 25% less than the average actually work rate performed in the Third Low level.

- Warm-up followed by three intervals of high effort, then low effort
- For improving aerobic capability or if extremity circulation problems are experienced
- Exercise at upper end of target zone to a moderate level of fatigue at each interval

Anaerobic Interval Training

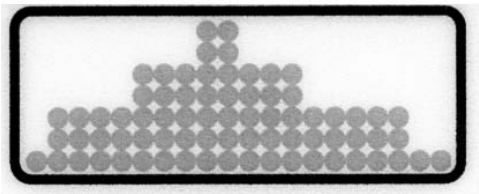


1. The starting segment (1, warm-up) is however hard the patient chooses to work.
2. First High level equals 300% more than the average actual work rate performed in the initial segment.
3. First Low level equals 75% less than the average actual work rate performed at the First High Level.
4. Second High Level equals 300% more than the average actual work rate performed in the First Low Level.
5. Second Low Level equals 75% less than the average actual work rate performed at the Second High Level.

6. Third High Level equals 300% more than the average actually work rate performed in the Second Low level.
7. Third Low Level equals 75% less than the average actual work rate performed at the Third High Level.
8. Fourth High Level equals 300% more than the average actually work rate performed in the Third Low level.
9. Fourth Low Level equals 75% less than the average actual work rate performed at the Fourth High Level.
10. Fifth High Level equals 300% more than the average actually work rate performed in the Fourth Low level.
11. Fifth Low Level equals 75% less than the average actual work rate performed at the Fifth High Level.
12. Sixth High Level equals 300% more than the average actual work rate performed in the Fifth Low level.
13. Sixth Low Level equals 75% less than the average actual work rate performed at the Sixth High Level.
14. Cool down equals 25% less than the average work rate performed in the Sixth Low Level.

- Warm-up followed by six short intervals of high-level effort
- Low intervals are 25% of high effort
- For improving strength and endurance – mimics sport conditions of short, intense effort followed by longer recovery periods

Pyramid



1. The starting segment (1, warm-up) is however hard the patient chooses to work.
2. First Level equals 65 % more than the average actual work rate performed in the initial warm up segment.
3. Second Level equals 20% more than the average actual work rate performed in the First Level.
4. Peak level equals 15% more than the average actual work rate performed in the Second Level.
5. First Level Descending equals 15% less than the average work performed at the Peak Level.
6. Second Level Descending equals 35% less than the average work performed at the Peak.
7. Cool Down equals 25% less than the average work performed in the Second Descending Level.

- Warm-up followed by three increasingly difficult intervals, then two less difficult intervals
- Peak effort is the set effort
- Less difficult intervals are 85% and 65% of peak effort
- Use for general conditioning of both aerobic and anaerobic systems

8. SRC CLINICAL PRO HEART RATE MONITORING

HEART RATE MONITORING

The SRC's optional Heart Rate Monitoring allows clinicians to monitor user heart rate during exercise sessions. This can be done using the optional heart rate contact handgrips, or by attaching an optional wireless heart-rate monitor directly to the patient.

Heart Rate Contact Handgrips

To use the heart rate contact handgrips for heart rate monitoring, the patient need only grasp both SRC heart rate contact handgrips while pedaling. The heart rate will be displayed in real-time value in the upper display window. When the heart rate is being displayed, the heart rate LED will be illuminated.

Wireless Heart Rate Chest Strap

The wireless Heart Rate Chest Strap is attached directly to the patient. When used, it sends heart rate related information directly to the display panel.

To attach the Heart Rate Chest Strap directly to the patient:

1. Have the patient lift shirt and secure the Heart Rate Chest Strap around the chest so that it is in direct contact with the skin just below the breast. (The strap should be dampened with a conducting gel, sponge or wet cloth to ensure maximum conductivity.)
2. Position the patient on the SRC and check that the heart rate information is being provided in the top window of the display panel.

HEART RATE CHART

As illustrated by the following chart, medical authorities have determined target heart rate ranges for optimum cardiovascular benefit. While the chart may be used as a guide or starting point, concessions must be made based on individual user needs.

⚠ ***CAUTION:*** *As a general guideline, use the following equation in estimating Maximum Heart Rate for a heart rate healthy user:*

Maximum Heart Rate = 220 - user age in years

Example: A heart rate healthy 30 year-old would use a Max. H/R of 190 beats per minute.

⚠ ***ATTENTION:*** *On ne do it jamais se servir de la pulsation cardiaque qui se rapproche de la limite maximum de sécurité de la personne. Servez-vous de l'équation suivante comme guide pour estimer la pulsation cardiaque maximum sécuritaire pour une personne en santé.*

Pulsation cardiaque maximum = 220 - l'âge de la personne

Example: Une personne de 30 ans en santé et sane probléme cardiaque devrait s'en tenir à une pulsation cardiaque maximum de 190 par minute.

NOTE: *If the heart rate is not displayed, or appears to be incorrect, adjust the Heart Rate Chest Strap for improved conductivity, or have the patient reposition both hands on the heart rate handle bar. (You may want to take the user's pulse rate manually and compare it against the displayed heart rate to confirm accuracy.)*

The following chart depicts standard Target Heart Rate ranges for optimum cardiovascular benefit. While this chart may be used as a guide for heart rate-healthy users, clinicians must be sure to set the Target Heart Rate based on individual patient protocol.

CAUTION: *When prescribed for therapeutic purposes, a physician should clearly define the parameters of use (i.e., total work, maximum heart rate, etc.) to reduce the risk of patient injury.*

ADVERTISSEMENT: *Quand l'appareil est untilisé en thérapue, le médecin responsable do it définir les paramétres spécifiques en patient pour limiter tout rique et nnotamment le travail total et la fréquence cardiaque.*

Age	**Estimated Maximal Attainable Heart Rate**	**85% Level**	**70% Level**
20	200	170	140
25	195	166	136
30	190	162	133
35	185	157	129
40	180	153	126
45	175	149	122
50	170	145	119
55	165	140	115
60	160	136	112
65	155	132	108

9. CLINICAL CONSIDERATIONS

CLINICAL CONSIDERATIONS
As with any other piece of user-interactive rehabilitation equipment, certain clinical considerations must be ensured before anyone is allowed to exercise on the Biodex SRC or SRC Clinical Pro. Following is a brief summary of some points to consider.

1. All users should have medical clearance prior to undertaking any rigorous exercise program. This is especially necessary for any user with a past history of heart rate problems or known risk factors including: family history of cardiovascular disease, elevated blood pressure, hyperlipidemia, diabetes, obesity, sedentary life style and smoking.

2. Start each user at a safe exercise level. Do not allow users to overexert themselves on the SRC. Symptoms of overexertion may include, but are not limited to: dizziness, nausea, pain or discomfort, shortness of breath or difficulty in breathing.

3. Prior to starting any exercise session, ensure that the user is comfortably seated. Be sure to adjust the seat height, seat front-to-back, handgrip angle and foot pedal straps as necessary. Mechanical adjustments are described in detail in the Mechanical Adjustments section of this manual.

4. Warm-up and warm-down periods are necessary to avoid suddenly taxing the heart and circulation system, and to help prevent injury to the muscles or joints. Sufficient warm-up and warm-down periods have also been shown to reduce muscle soreness following exercise. Be sure to allow for a minimum of 3 to 5 minutes of gradually increasing exercise intensity prior to starting the actual exercise session and a similar amount of time of decreasing exercise intensity following each session.

5. Any pedaling position resulting in the tibia tilting anteriorly nine degrees or greater will cause the patellofemoral joint to absorb the force. This is often a result of a low seat height or the user pedaling with the ball of the foot.

6. Positions causing the tibia to tilt posteriorly, forcing the femur to move posteriorly, will place stress upon the anterior cruciate ligament and menisci. This is often the result of a high seat or a user pedaling with the heel.

CONSIDÈRATIONS CLINIQUES
Comme pour tout équipement de rééducation avec interface utilisateur, on do it síassurer du respect de certaines considérations cliniques avant de permettre à quiconque de síexercer sur líappareil SRC de Biodex Medical Systems. Voici un bref résumé des points quíil faut prendre en compte.

1. Tous les utilisateurs doivent recevoir une permission médicale avant díentreprendre tout programme díexercices vigoureux. Ceci revÍt une nécessité particulière pour les utilisateurs ayant un historique de problèmes cardiaques ou des facteurs de risques connus, comme la maladie cardiovasculaire, líhypertension artérielle, líhyperlipidémie, le diabète, líobésité, le mode de vie sédentaire, ainsi que le tabagisme.

2. Faire commencer chaque utilisateur à un niveau díexercice sécuritaire. Ne pas permettre aux utilisateurs de se surmener sur líappareil SRC. Les symptÙmes du surmenage peuvent comprendre, sans limiter la généralité de cette énumération†: les étourdissements, la nausée, la douleur ou le malaise, le souffle court ou la difficulté à respirer.

3. Avant de commencer toute séance díexercice, síassurer que le patient est assis confortablement. Veiller au réglage de la hauteur du siège, de líavance-recul du siège, de líangle du guidon, ainsi que des courroies de pédale, au besoin. Les réglages mécaniques sont décrits dans la section Réglages mécaniques du présent manuel.

4. Des périodes díéchauffement et de refroidissement sont nécessaires pour éviter de surcharger soudainement le cúur et le système circulatoire, et aider à prévenir les lésions aux muscles et aux articulations. Il est démontré que des périodes suffisantes díéchauffement et de refroidissement réduisent les douleurs musculaires après líexercice. Veiller à prévoir un minimum de trois à cinq minutes díexercices augmentant graduellement en intensité avant le début de la séance díexercice proprement dite, ainsi quíune période similaire après chaque séance.

5. Il en résulte que les taux de travail diminuent lorsque la hauteur du siège diminue. Cela peut se justifier, en revanche, par le besoin de faire travailler les hanches et les genoux dans des plages de mouvement précises, ou par líaccent à mettre sur des groupes de muscles particuliers, en fonction des objectifs du traitement.

6. Les positions qui font s'incliner le tibia vers l'arrière, contraignant le fémur à se déplacer vers l'arrière, font porter l'effort sur le ligament croisé antérieur du genou et les ménisques. Ceci a souvent pour origine une position élevée du siège, ou un utilisateur qui pédale avec le talon.

WHAT IS A MET?
The Acronym MET stands for "metabolic equivalents"

METS are a unit of measurement that estimate the amount of physical demand placed on a person's cardiopulmonary system. METS are often used in prescribing exercise for patients involved in cardiopulmonary rehabilitation.

The MET level at which one exercises, is directly proportional to the amount of oxygen being consumed, the amount of power (watts) accomplished, and the amount of calories burned while exercising.

1 MET is equal to the amount of oxygen the body consumes at rest (lying down). The amount of oxygen one consumes at rest is estimated to be approximately 3.5 ml of oxygen for each kilogram of body weight every minute or 3.5ml/kg/min.

Each increase in energy expenditure of 3.5 ml/kg/min. is increasing one's energy expenditure by 1 MET.

MET charts have been developed by researchers to estimate the MET levels of domestic and recreational activities. These estimations are generalizations as to how many times an individual needs to elevate their metabolic rate (METS) to accomplish such activities.

The American College of Sports Medicine has published formulas to estimate the oxygen cost of exercising at various work loads on treadmills, lower body cycles, upper body cycles, stepping, and outdoor walking and running. MET levels can be determined by simply dividing oxygen consumption in ml/kg/min. by 3.5.

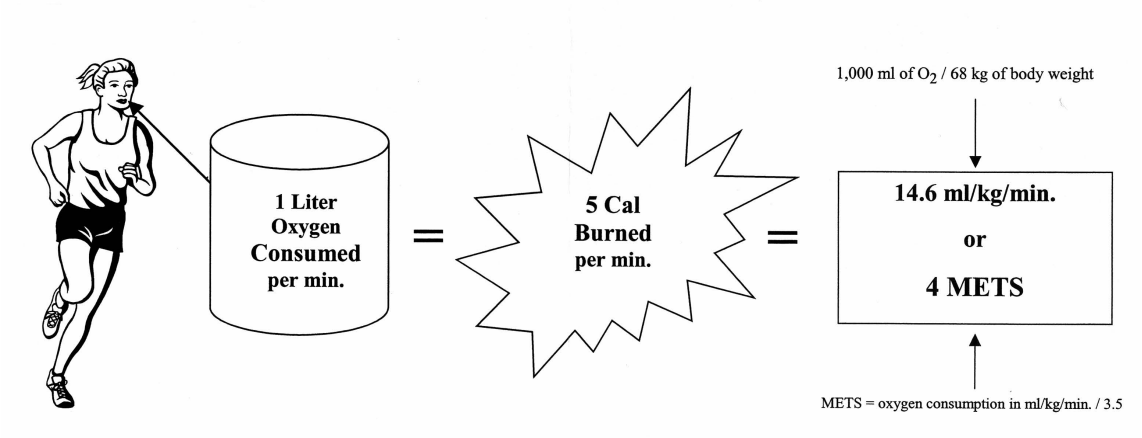
BIODEX ERGOMETERS SUPPORT METS AND AID EXERCISE PRESCRIPTION FOR BOTH CARDIOPULMONARY REHABILITATION AND MEDICAL FITNESS

A cardiac stress test typically reports the max MET level achieved by the patient and/or the MET level achieved at the point the test turned positive (often demonstrating ischemic changes in the heart muscle and/or inappropriate arrhythmias). Cardiologists often ask therapists to keep a patient below a certain MET level based on this information from the cardiac stress test. The Cardiologist will report, for example, "ischemic changes at 10 METS/Heart Rate 128. Exercise at or below 9 METS".

Different types of cardiovascular exercise machines require the user to work at different work loads (watts) to ensure a consistent elevation of an individual's metabolic rate and the corresponding appropriate heart rate. Cranking an upper body cycle at 100 watts will, for example, have a very different effect on one's metabolic rate and heart rate when compared to pedaling a lower body cycle at 100 watts. It is up to the clinician to set the appropriate workloads on each ergometer, or speed and elevation on the treadmill, to achieve the appropriate MET level.

THE RELATIONSHIP OF CALORIES BURNED TO OXYGEN CONSUMPTION AND METS

For every liter of oxygen consumed by the body during exercise, the body burns approximately 5 calories. The example below shows a 150 lb (68 kg) individual exercising at a level requiring an oxygen consumption of 1 liter (1,000 ml) of oxygen each min., which would require that they burn 5 calories each min. to supply the appropriate amount of energy for the exercise. This same individual would be burning 14.6 milliliters of oxygen for each kilogram of body weight per min. (1,000 ml of oxygen / 68 kg of body weight). Since one MET = (oxygen consumption in ml/kg/min.) / (3.5), this individual would be exercising at 4 METS. They would need to elevate their resting metabolism approximately 4 times to achieve this sustain this rate of exercise.



QU'EST-CE QU'UN MET?
L'acronyme MET signifie « équivalent métabolique ».

Le MET sert d'unité de mesure pour estimer l'effort demandé au système cardiopulmonaire d'une personne. On utilise souvent les MET pour prescrire des exercices à des patients en cours de réadaptation cardiopulmonaire.

Le taux métabolique (en MET) auquel on effectue un exercice est directement proportionnel à la quantité d'oxygène consommée, à la puissance développée (en watts) et aux calories brûlées durant l'exercice.

Le MET correspond à la quantité d'oxygène que l'organisme consomme au repos (sujet couché). On estime cette quantité à environ 3,5 millilitres d'oxygène par kilogramme de poids corporel par minute, soit 3,5 ml/kg/min.

Chaque augmentation de 3,5 ml/kg/min de la dépense énergétique augmente la vitesse de métabolisme de 1 MET.

Les chercheurs ont mis au point des tableaux où ils estiment le nombre de MET pour des activités domestiques et récréatives. Ces estimations sont des généralisations sur le nombre de fois qu'une personne doit augmenter son taux métabolique (le nombre de MET qu'elle doit développer) pour effectuer ces activités.

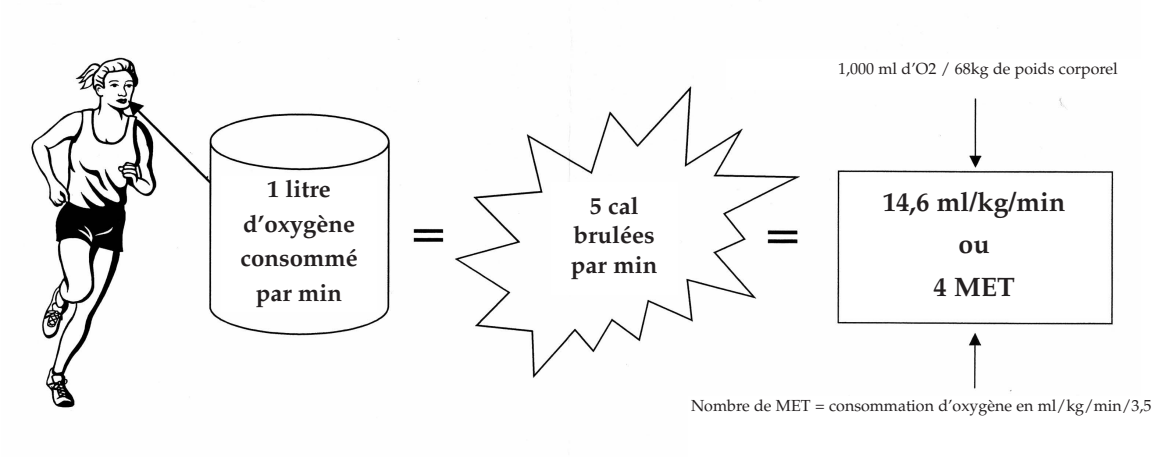
L'American College of Sports Medicine publie des formules permettant de faire l'estimation de la dépense en oxygène de l'exercice, sous diverses charges de travail, sur tapis roulant, sur cycles pour membres inférieurs et pour membres supérieurs, de la montée-descente sur escabeau, ainsi que de la marche et de la course à l'extérieur. On calcule le taux métabolique en MET en divisant simplement la consommation d'oxygène (en ml/kg/min) par 3,5.

LES ERGOMÈTRES BIODEX FACILITENT LE CALCUL DES MET ET LES PRESCRIPTIONS D'EXERCICE POUR RÉADAPTATION CARDIOPULMONAIRE ET MISE EN FORME SOUS SURVEILLANCE MÉDICALE.
L'épreuve d'effort cardiaque indique normalement le nombre maximal de MET atteint par le patient, ou le nombre de MET au point où l'épreuve passe au positif (souvent avec manifestation de changements ischémiques dans le muscle cardiaque ou d'arythmies inappropriées). Les cardiologues demandent souvent aux thérapeutes de maintenir le patient au-dessous d'un certain nombre de MET sur la foi de cette information, glanée de l'épreuve d'effort cardiaque. Dans son rapport, le cardiologue fait état, par exemple de « modifications ischémiques à 10 MET/fréquence cardiaque 128. Exercice à vitesse de métabolisme égale ou inférieure à 9 MET. »

Les différents types de machines d'exercice cardiovasculaire demandent à l'utilisateur des charges de travail (en watts) différentes pour assurer une augmentation uniforme de la vitesse de son métabolisme, ainsi que la fréquence cardiaque correspondante appropriée. Activer les manivelles d'un cycle pour membres supérieurs à 100 watts, ou pédaler un cycle pour membres inférieurs à 100 watts, sont des activités qui ont de effets très différents sur la vitesse de métabolisme et la fréquence cardiaque du sujet. C'est au clinicien qu'il revient de fixer les charges de travail qui conviennent sur chaque ergomètre, ou la vitesse et l'élévation du tapis roulant, afin d'atteindre le taux métabolique en MET approprié.

RAPPORT ENTRE CALORIES BRÛLÉES, CONSOMMATION D'OXYGÈNE ET MET

Pour chaque litre d'oxygène consommé par l'organisme durant l'exercice, ce dernier brûle environ 5 calories. L'exemple ci-dessous illustre une personne de 68 kg (150 lb) s'exerçant à un niveau qui demande une consommation de 1 litre (1 000 ml) d'oxygène chaque minute. Pour ce faire, elle doit brûler 5 calories chaque minutes afin de fournir la quantité d'énergie appropriée à l'exercice. Cette même personne brûle 14,6 millilitres d'oxygène pour chaque kilogramme de son poids corporel par minute (1 000 ml d'oxygène / 68 kg de poids corporel). Étant donné que un MET = (consommation d'oxygène en ml/kg/min) / (3,5), cette personne s'exerce à un taux de 4 MET. Elle doit augmenter son métabolisme au repos environ 4 fois pour atteindre et maintenir ce taux d'exercice.


1,000 ml d'O2 / 68kg de poids corporel
1 litre d'oxygène consommé par min
=
5 cal brulées par min
=
14,6 ml/kg/min ou 4 MET
Nombre de MET = consommation d'oxygène en ml/kg/min/3,5

10. MAINTENANCE AND SERVICE PROCEDURES

STANDARD MAINTENANCE

The Biodex SRCs are designed to provide many years of dependable use. To help ensure this product performs to maximum specifications, and to increase the life of the product, please note the following general cleaning instructions and service procedures.

- As required, clean all exterior surfaces, upholstery and restraining straps. Specialized vinyl cleaners or protectants are recommended for upholstery and cushions. Otherwise, use a solution of warm water and mild detergent.

- As needed, wipe the display using a soft rag dampened with alcohol.

BATTERY REMOVAL AND REPLACEMENT

(See Figure 3.)

NOTE: *Before proceeding turn OFF power and ensure power pack is unplugged from outlet.*

1. Remove the twelve Phillips screws that secure cover. Carefully slide the left cover out of the way (removing the left side crank arm will make this procedure easier, but is not necessary. Crank arm removal requires a special crank arm puller, available at most bicycle repair shops.)
2. Remove the battery bracket top Phillips screw.
3. Rotate bracket down.
4. Disconnect power wires from battery connectors, red from red and black from black.
5. Disconnect the battery temperature sensor cable at connector J1 on the power supply board.
6. Remove battery
7. Reconnect power leads, red to red and black to black, on battery terminals and reinstall the battery temperature sensor cable at connector J1 on the power supply board.
8. Place battery in holder, turn bracket upright (refer to illustration).
9. Insert Phillips screw and tighten both.
10. Install covers and reinstall the twelve Phillips securing screws.
11. Test ergometer operation.

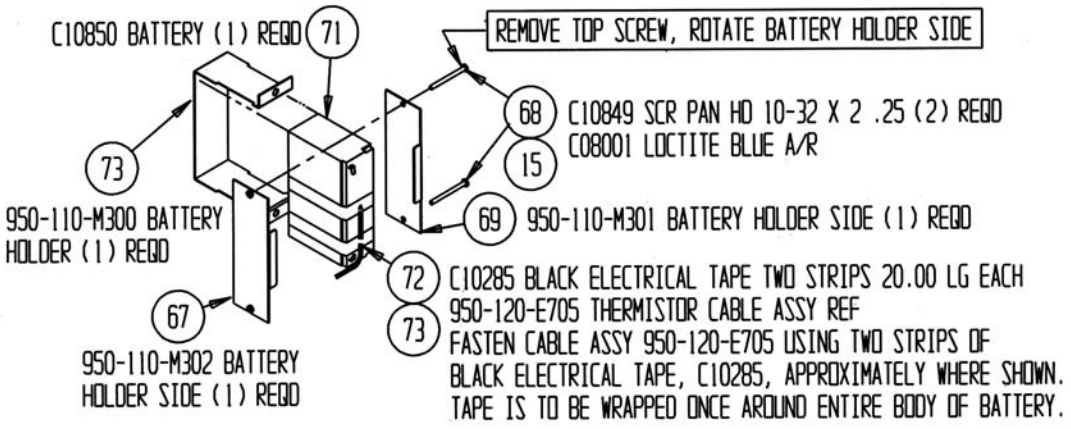

C10850 BATTERY (1) REQD
71
REMOVE TOP SCREW, ROTATE BATTERY HOLDER SIDE
68
C10849 SCR PAN HD 10-32 X 2 .25 (2) REQD
C08001 LOCTITE BLUE A/R
15
73
950-110-M300 BATTERY HOLDER (1) REQD
69
950-110-M301 BATTERY HOLDER SIDE (1) REQD
72
C10285 BLACK ELECTRICAL TAPE TWO STRIPS 20.00 LG EACH
950-120-E705 THERMISTOR CABLE ASSY REF
73
FASTEN CABLE ASSY 950-120-E705 USING TWO STRIPS OF BLACK ELECTRICAL TAPE, C10285, APPROXIMATELY WHERE SHOWN. TAPE IS TO BE WRAPPED ONCE AROUND ENTIRE BODY OF BATTERY.
67
950-110-M302 BATTERY HOLDER SIDE (1) REQD

Figure 3. Replacing the battery.

REPLACING THE ALTERNATOR BELT
(See Figure 4.)

NOTE: *Before proceeding turn power OFF and ensure power pack is unplugged from outlet.*

1. Remove the twelve Phillips screws that secure covers. Carefully slide the left cover out of the way. If you would like to remove the cover completely, remove the pedal crank*.
2. Loosen alternator tension lock bolt (refer to illustration). Now turn the alternator tension adjust nut counter clockwise, until belt is loose enough to remove from pulleys.
3. Place belt around alternator pulley and large flywheel (refer to illustration).
4. Turn alternator tension adjustment nut clockwise to tighten belt. For proper tensioning turn nut until belt deflects no more then .25", by pressing on the belt between the pulleys. The location where to press on belt is marked by the belt identification arrow on illustration.
5. Once tension is adjusted, tighten alternator tension lock bolt.
6. Slide the covers into place and reinstall the twelve Phillips screws.
7. Test ergometer operation.

* Remove pedal crank arm caps by unscrewing with flat blade screw driver. Once the cap is removed, remove .50" crank arm bolts (they are secured with Loctite). Next remove crank arms. A pedal crank arm puller (available at most bicycle repair centers,) is recommended. To install crank arms, slide crank arms onto shaft so that the cranks are 180 degrees apart. Next apply Loctite Blue to the bolt threads. Tighten.

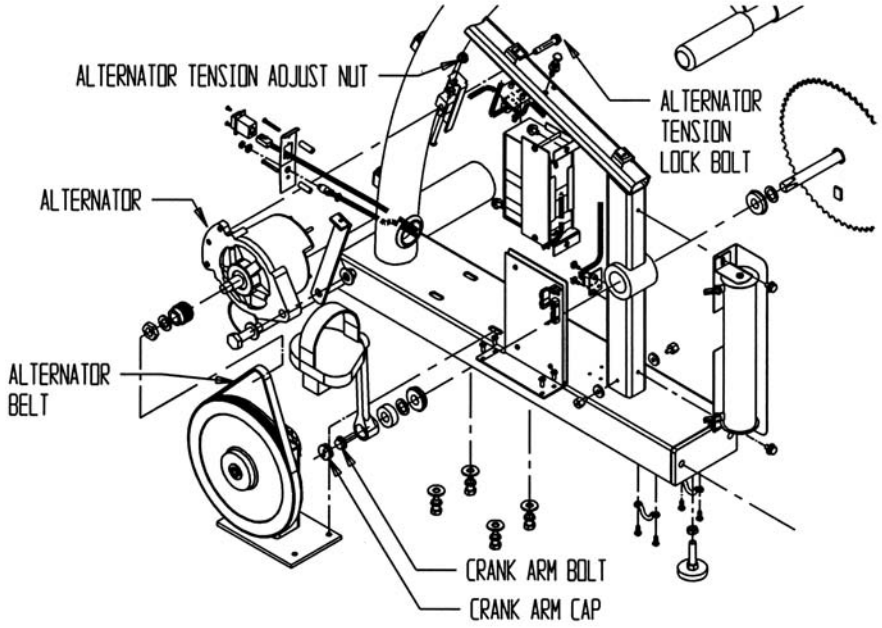


Figure 4. Changing the alternator belt.

11. SPECIFICATIONS

Dimensions: 70" l x 23" w x 49" h (58 x 178 x 124 cm)

Resistance:

Constant Power (Effort Level Control): 39 Effort Levels (5-watt increments from 10 to 100 watts, 10-watt increments from 110 to 300 watts)
Isokinetic (Speed Control): 20 speed settings (increments of 5 deg/sec)

Work Rate Range: 10 watts (25 rpm) to 600 watts (120 rpm)

Speed Control Range: 25 to 120 deg/sec

Readouts: Time, RPM, Watts, Calories, MET's, Heart Rate

Heart Rate Monitoring: Polar® telemetry (chest strap) and contact handgrip system

Communication: FitLinxx® compatible, CSAFE protocol for data export

Seat Capacity: 350 lb (159 kg)

Weight: 160 lb (72 kg)

Power: Self-Powered. No external power requirement at user work rates over 30 watts and 50 rpms. 115 VAC adapter (230 VAC available) is provided to power system and charge battery during applications below 30 watts and 50 rpms. Battery automatically recharges at work rates above 30 watts and 50 rpms.

Certification: ETL listed

Warranty: 2-years parts, 1-year labor

Mfg: Biodex Medical Systems
20 Ramsay Road
Shirley, NY 11967-4704

Classification: Class I measuring, Type B,
ordinary equipment, continuous operation

Authorized European Community Representative: Prothia, Paris, France

CE TYPE B EQUIPMENT

12. BIBLIOGRAPHY

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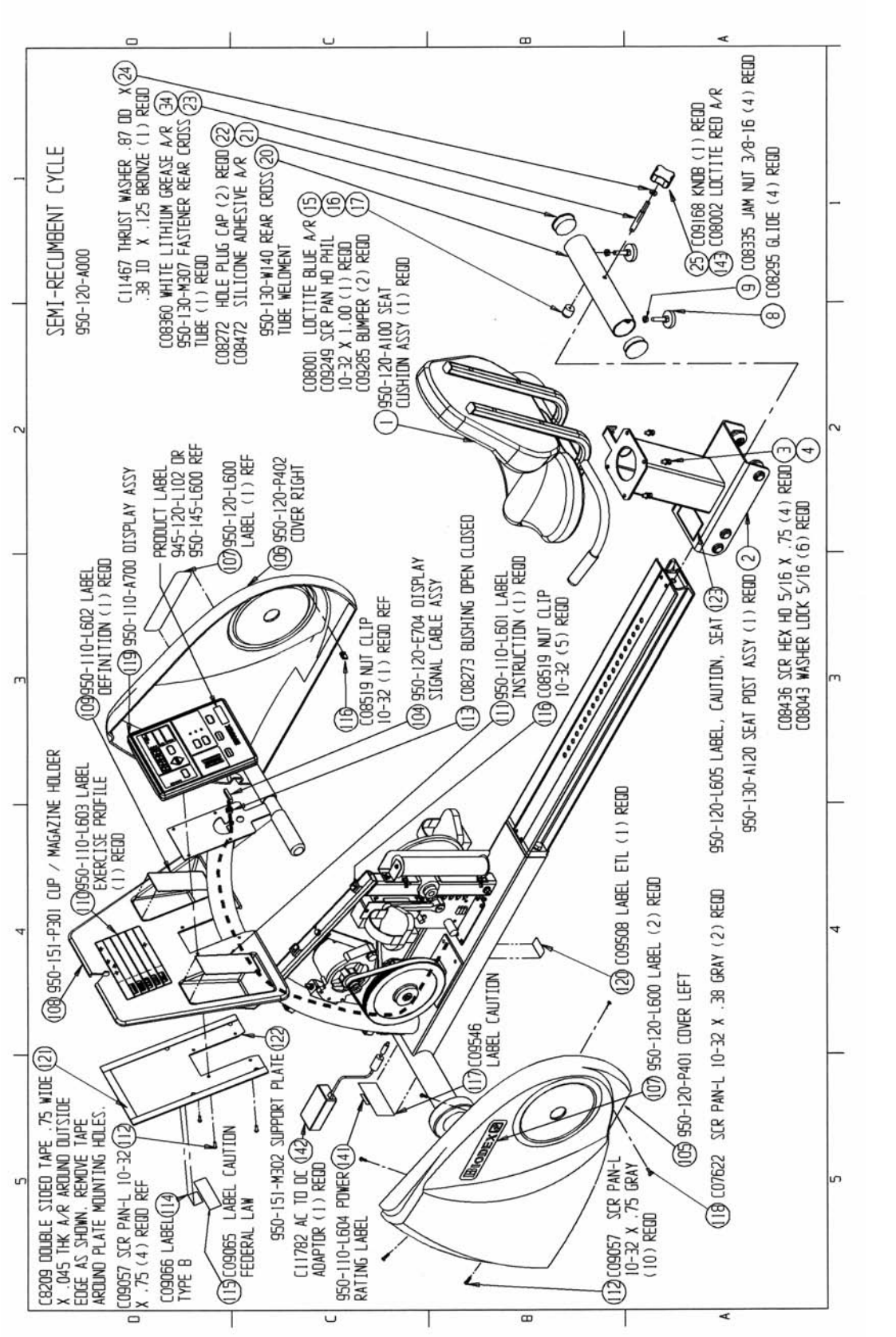
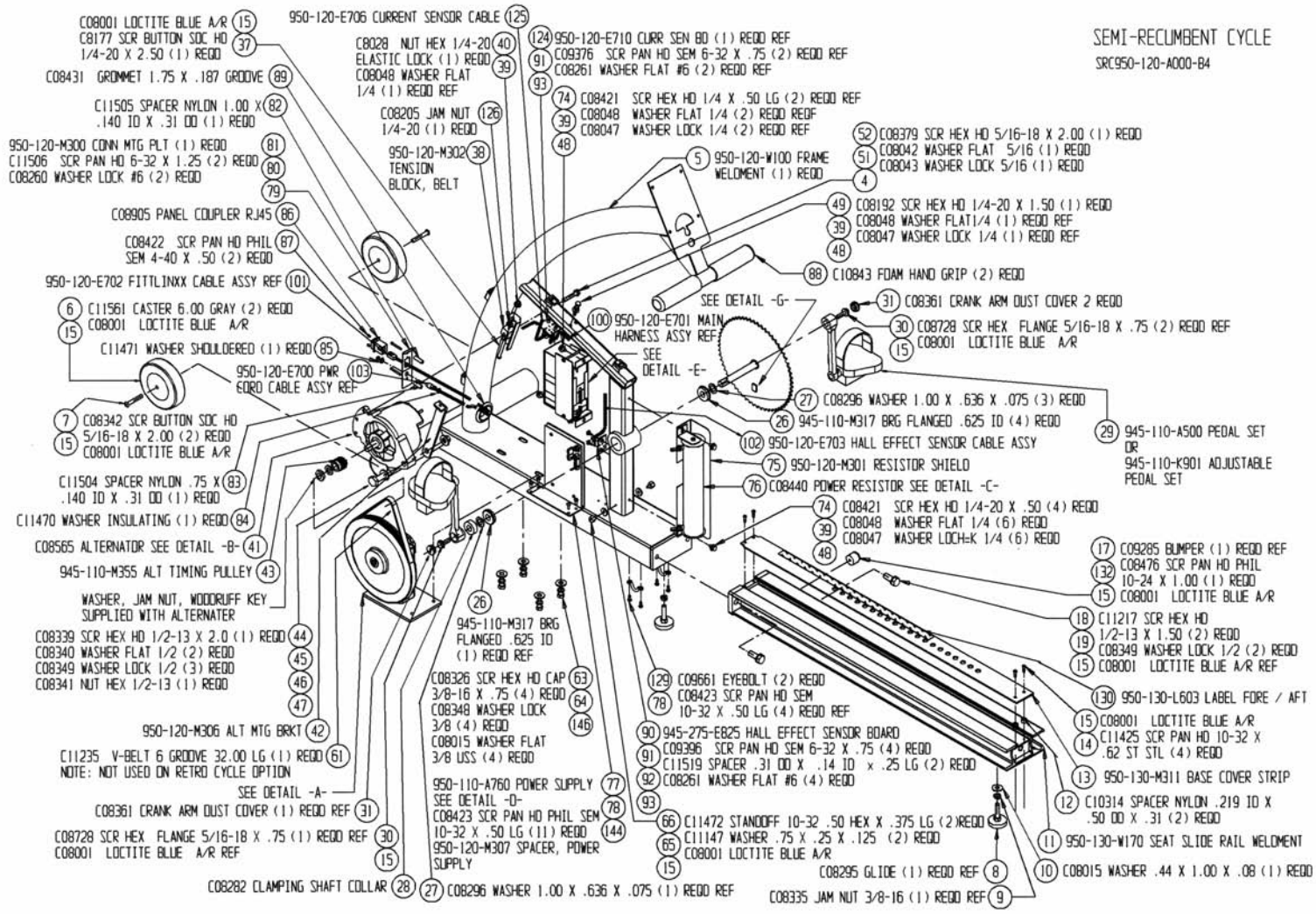
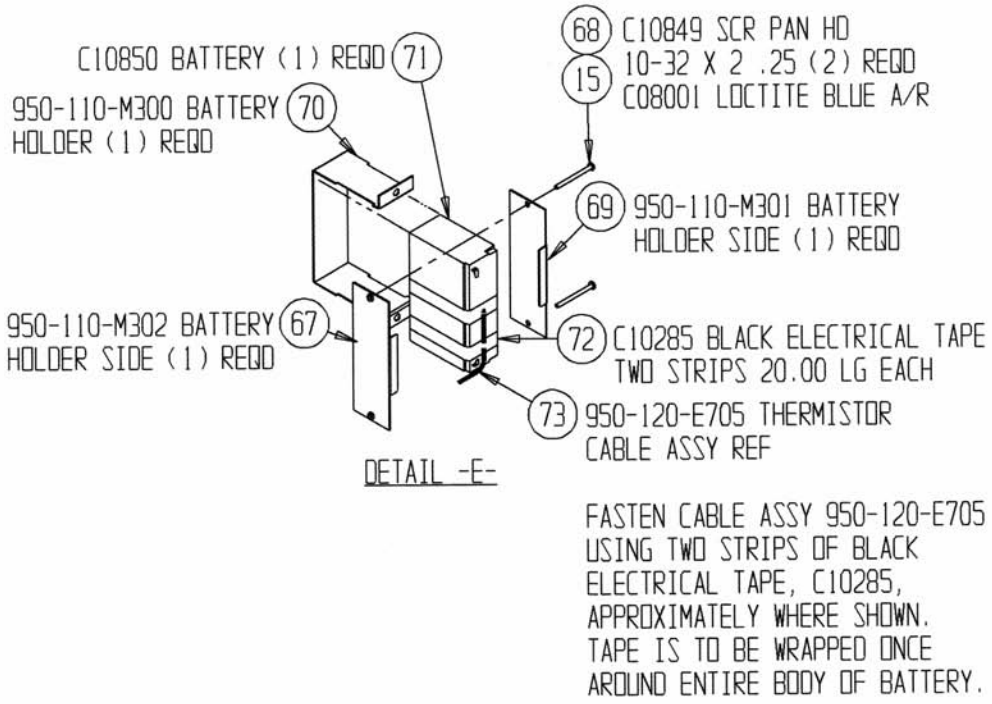
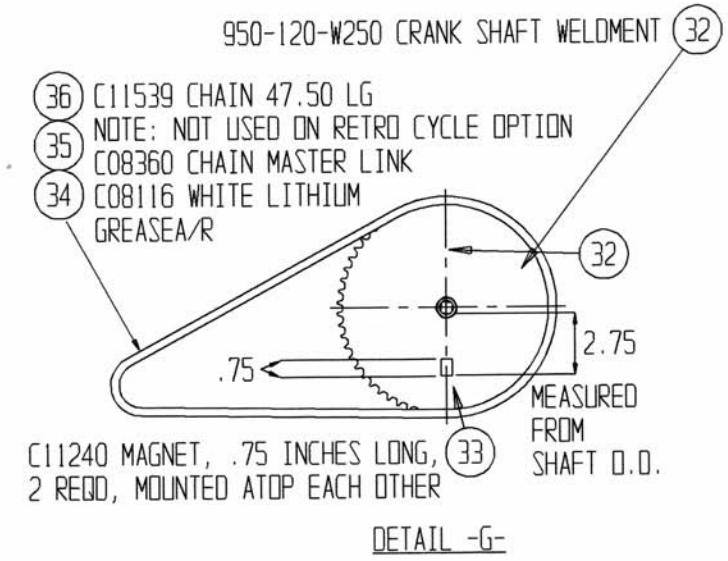
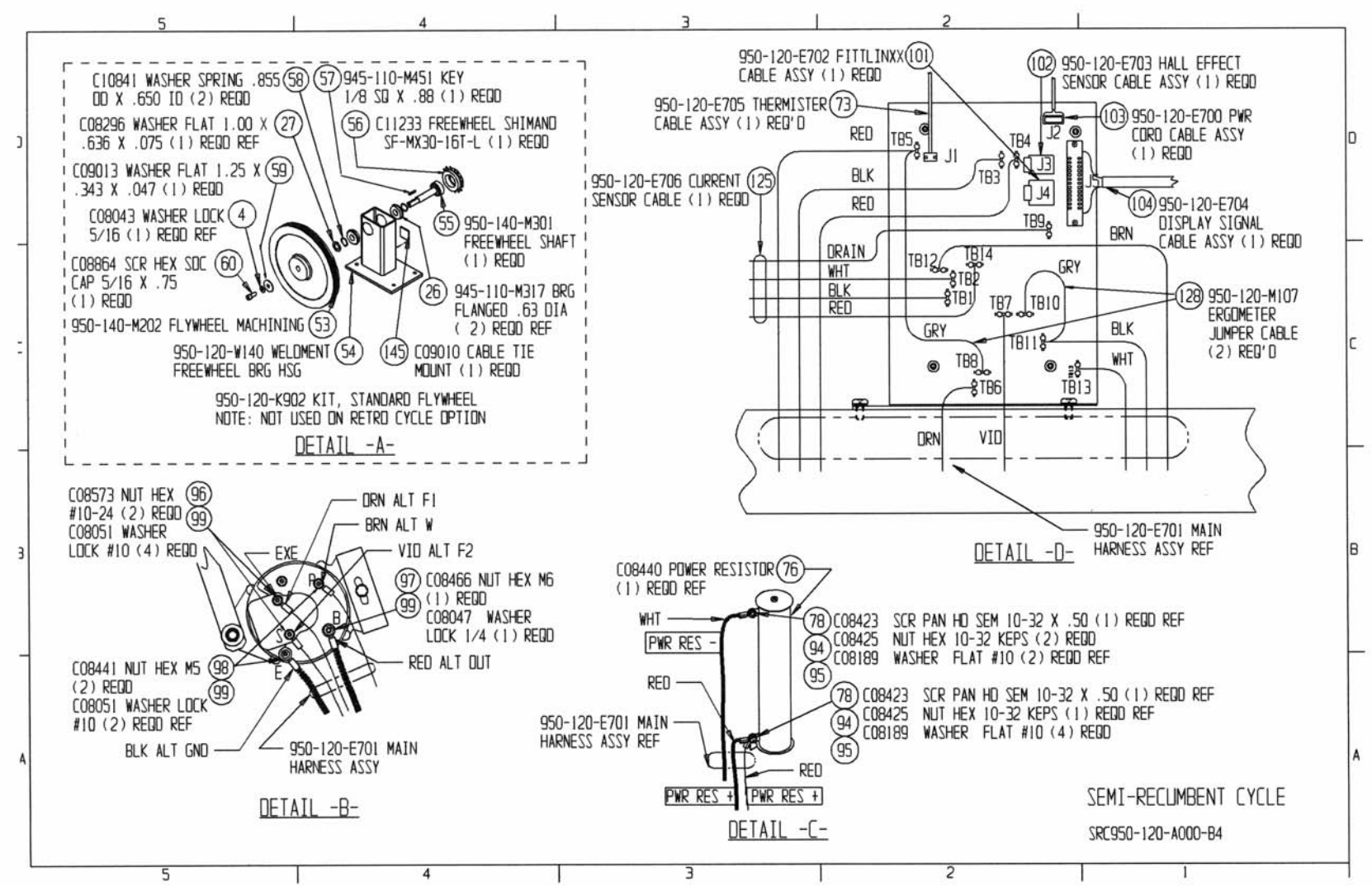
13. REPLACEMENT

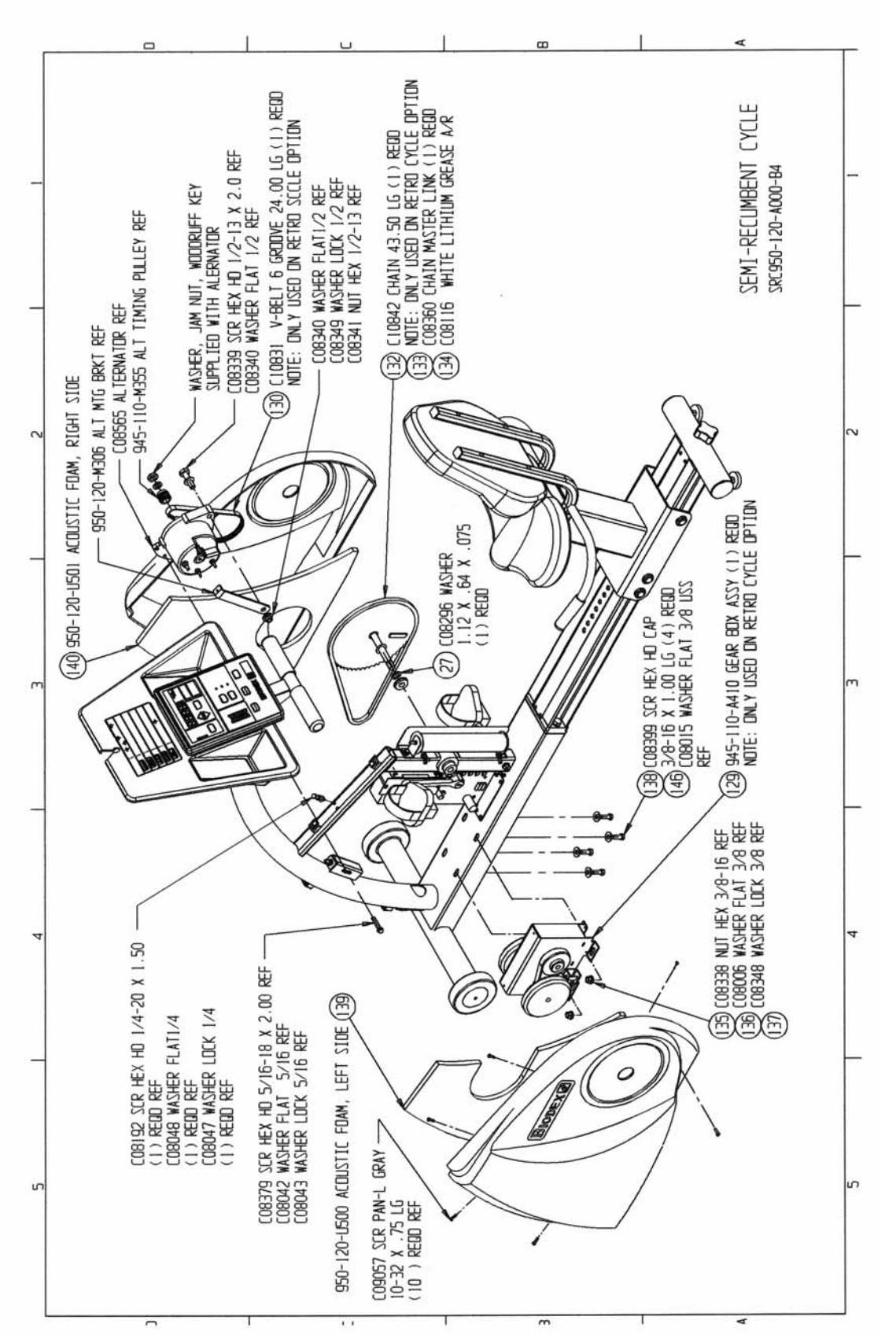

SEMI-RECUMBENT CYCLE
950-120-A000
C11467 THRUST WASHER .87 OD X .38 ID X .125 BRONZE (1) REQD
C08360 WHITE LITHIUM GREASE A/R
950-130-M307 FASTENER REAR CROSS TUBE (1) REQD
C08272 HOLE PLUG CAP (2) REQD
C08472 SILICONE ADHESIVE A/R
950-130-W140 REAR CROSS TUBE WELDMENT
C08001 LOCTITE BLUE A/R
C09249 SCR PAN HD PHIL 10-32 X 1.00 (1) REQD
C09285 BUMPER (2) REQD
950-120-A100 SEAT CUSHION ASSY (1) REQD
C09168 KNOB (1) REQD
C08002 LOCTITE RED A/R
C08335 JAM NUT 3/8-16 (4) REQD
C08295 GLIDE (4) REQD
C08436 SCR HEX HD 5/16 X .75 (4) REQD
C08043 WASHER LOCK 5/16 (6) REQD
950-130-A120 SEAT POST ASSY (1) REQD
950-120-L605 LABEL, CAUTION, SEAT
C07622 SCR PAN-L 10-32 X .38 GRAY (2) REQD
C09057 SCR PAN-L 10-32 X .75 GRAY (10) REQD
950-120-P401 COVER LEFT
950-120-L600 LABEL (2) REQD
C09508 LABEL ETL (1) REQD
C09546 LABEL CAUTION
C08519 NUT CLIP 10-32 (5) REQD
950-110-L601 LABEL INSTRUCTION (1) REQD
C08273 BUSHING OPEN CLOSED
950-120-E704 DISPLAY SIGNAL CABLE ASSY
C08519 NUT CLIP 10-32 (1) REQD REF
950-120-P402 COVER RIGHT
950-120-L600 LABEL (1) REF
PRODUCT LABEL 945-120-L102 DR 950-145-L600 REF
950-110-A700 DISPLAY ASSY
950-110-L602 LABEL DEFINITION (1) REQD
950-110-L603 LABEL EXERCISE PROFILE (1) REQD
950-151-P301 CUP / MAGAZINE HOLDER
C8209 DOUBLE SIDED TAPE .75 WIDE X .045 THK A/R AROUND OUTSIDE EDGE AS SHOWN. REMOVE TAPE AROUND PLATE MOUNTING HOLES.
C09057 SCR PAN-L 10-32 X .75 (4) REQD REF
C09066 LABEL TYPE B
C09065 LABEL CAUTION FEDERAL LAW
950-151-M302 SUPPORT PLATE
C11782 AC TO DC ADAPTOR (1) REQD
950-110-L604 POWER RATING LABEL


SEMI-RECUMBENT CYCLE
SRC950-120-A000-B4
C08001 LOCTITE BLUE A/R (15)
C8177 SCR BUTTON SOC HD 1/4-20 X 2.50 (1) REQD (37)
C08431 GROMMET 1.75 X .187 GROOVE (89)
C11505 SPACER NYLON 1.00 X .140 ID X .31 OD (1) REQD (82)
950-120-M300 CONN MTG PLT (1) REQD (81)
C11506 SCR PAN HD 6-32 X 1.25 (2) REQD (80)
C08260 WASHER LOCK #6 (2) REQD (79)
C08905 PANEL COUPLER RJ45 (86)
C08422 SCR PAN HD PHIL SEM 4-40 X .50 (2) REQD (87)
950-120-E702 FITTLINXX CABLE ASSY REF (101)
6 C11561 CASTER 6.00 GRAY (2) REQD
15 C08001 LOCTITE BLUE A/R
C11471 WASHER SHOULDERED (1) REQD (85)
950-120-E700 PWR CORD CABLE ASSY REF (103)
7 C08342 SCR BUTTON SOC HD 5/16-18 X 2.00 (2) REQD
15 C08001 LOCTITE BLUE A/R
C11504 SPACER NYLON .75 X .140 ID X .31 OD (1) REQD (83)
C11470 WASHER INSULATING (1) REQD (84)
C08565 ALTERNATOR SEE DETAIL -B- (41)
945-110-M355 ALT TIMING PULLEY (43)
WASHER, JAM NUT, WOODRUFF KEY SUPPLIED WITH ALTERNATER
C08339 SCR HEX HD 1/2-13 X 2.0 (1) REQD (44)
C08340 WASHER FLAT 1/2 (2) REQD (45)
C08349 WASHER LOCK 1/2 (3) REQD (46)
C08341 NUT HEX 1/2-13 (1) REQD (47)
950-120-M306 ALT MTG BRKT (42)
C11235 V-BELT 6 GROOVE 32.00 LG (1) REQD (61)
NOTE: NOT USED ON RETRO CYCLE OPTION
SEE DETAIL -A-
C08361 CRANK ARM DUST COVER (1) REQD REF (31)
C08728 SCR HEX FLANGE 5/16-18 X .75 (1) REQD REF (30)
C08001 LOCTITE BLUE A/R REF (15)
C08282 CLAMPING SHAFT COLLAR (28)
950-120-E706 CURRENT SENSOR CABLE (125)
C8028 NUT HEX 1/4-20 ELASTIC LOCK (1) REQD (40)
C08048 WASHER FLAT 1/4 (1) REQD REF (39)
C08205 JAM NUT 1/4-20 (1) REQD (126)
950-120-M302 TENSION BLOCK, BELT (38)
950-120-E710 CURR SEN BD (1) REQD REF (124)
C09376 SCR PAN HD SEM 6-32 X .75 (2) REQD REF (91)
C08261 WASHER FLAT #6 (2) REQD REF (93)
C08421 SCR HEX HD 1/4 X .50 LG (2) REQD REF (74)
C08048 WASHER FLAT 1/4 (2) REQD REF (39)
C08047 WASHER LOCK 1/4 (2) REQD REF (48)
5 950-120-W100 FRAME WELDMENT (1) REQD
C08379 SCR HEX HD 5/16-18 X 2.00 (1) REQD (52)
C08042 WASHER FLAT 5/16 (1) REQD (51)
C08043 WASHER LOCK 5/16 (1) REQD (4)
C08192 SCR HEX HD 1/4-20 X 1.50 (1) REQD (49)
C08048 WASHER FLAT1/4 (1) REQD REF (39)
C08047 WASHER LOCK 1/4 (1) REQD REF (48)
C10843 FOAM HAND GRIP (2) REQD (88)
SEE DETAIL -G-
100 950-120-E701 MAIN HARNESS ASSY REF
SEE DETAIL -E-
C08361 CRANK ARM DUST COVER 2 REQD (31)
C08728 SCR HEX FLANGE 5/16-18 X .75 (2) REQD REF (30)
C08001 LOCTITE BLUE A/R (15)
C08296 WASHER 1.00 X .636 X .075 (3) REQD (27)
945-110-M317 BRG FLANGED .625 ID (4) REQD (26)
950-120-E703 HALL EFFECT SENSOR CABLE ASSY (102)
950-120-M301 RESISTOR SHIELD (75)
C08440 POWER RESISTOR SEE DETAIL -C- (76)
C08421 SCR HEX HD 1/4-20 X .50 (4) REQD (74)
C08048 WASHER FLAT 1/4 (6) REQD (39)
C08047 WASHER LOCH-K 1/4 (6) REQD (48)
945-110-A500 PEDAL SET OR 945-110-K901 ADJUSTABLE PEDAL SET (29)
C09285 BUMPER (1) REQD REF (17)
C08476 SCR PAN HD PHIL 10-24 X 1.00 (1) REQD (132)
C08001 LOCTITE BLUE A/R (15)
C11217 SCR HEX HD 1/2-13 X 1.50 (2) REQD (18)
C08349 WASHER LOCK 1/2 (2) REQD (19)
C08001 LOCTITE BLUE A/R REF (15)
950-130-L603 LABEL FORE / AFT (130)
C08001 LOCTITE BLUE A/R (15)
C11425 SCR PAN HD 10-32 X .62 ST STL (4) REQD (14)
950-130-M311 BASE COVER STRIP (13)
C10314 SPACER NYLON .219 ID X .50 OD X .31 (2) REQD (12)
950-130-W170 SEAT SLIDE RAIL WELDMENT (11)
C08015 WASHER .44 X 1.00 X .08 (1) REQD (10)
C08295 GLIDE (1) REQD REF (8)
C08335 JAM NUT 3/8-16 (1) REQD REF (9)
945-110-M317 BRG FLANGED .625 ID (1) REQD REF (26)
C08326 SCR HEX HD CAP 3/8-16 X .75 (4) REQD (63)
C08348 WASHER LOCK 3/8 (4) REQD (64)
C08015 WASHER FLAT 3/8 USS (4) REQD (146)
950-110-A760 POWER SUPPLY SEE DETAIL -D- (77)
C08423 SCR PAN HD PHIL SEM 10-32 X .50 LG (11) REQD (78)
950-120-M307 SPACER, POWER SUPPLY (144)
C09661 EYEBOLT (2) REQD (129)
C08423 SCR PAN HD SEM 10-32 X .50 LG (4) REQD REF (78)
945-275-E825 HALL EFFECT SENSOR BOARD (90)
C09396 SCR PAN HD SEM 6-32 X .75 (4) REQD (91)
C11519 SPACER .31 OD X .14 ID x .25 LG (2) REQD (92)
C08261 WASHER FLAT #6 (4) REQD (93)
C11472 STANDOFF 10-32 .50 HEX X .375 LG (2)REQD (66)
C11147 WASHER .75 X .25 X .125 (2) REQD (65)
C08001 LOCTITE BLUE A/R (15)
C08282 CLAMPING SHAFT COLLAR (28)
C08296 WASHER 1.00 X .636 X .075 (1) REQD REF (27)


68 C10849 SCR PAN HD
10-32 X 2 .25 (2) REQD
15 C08001 LOCTITE BLUE A/R
C10850 BATTERY (1) REQD 71
950-110-M300 BATTERY
HOLDER (1) REQD 70
69 950-110-M301 BATTERY
HOLDER SIDE (1) REQD
950-110-M302 BATTERY
HOLDER SIDE (1) REQD 67
72 C10285 BLACK ELECTRICAL TAPE
TWO STRIPS 20.00 LG EACH
73 950-120-E705 THERMISTOR
CABLE ASSY REF
DETAIL -E-
FASTEN CABLE ASSY 950-120-E705
USING TWO STRIPS OF BLACK
ELECTRICAL TAPE, C10285,
APPROXIMATELY WHERE SHOWN.
TAPE IS TO BE WRAPPED ONCE
AROUND ENTIRE BODY OF BATTERY.


950-120-W250 CRANK SHAFT WELDMENT 32
36 C11539 CHAIN 47.50 LG
NOTE: NOT USED ON RETRO CYCLE OPTION
35 C08360 CHAIN MASTER LINK
34 C08116 WHITE LITHIUM
GREASE A/R
32
2.75
.75
MEASURED
FROM
SHAFT O.D.
C11240 MAGNET, .75 INCHES LONG, 33
2 REQD, MOUNTED ATOP EACH OTHER
DETAIL -G-

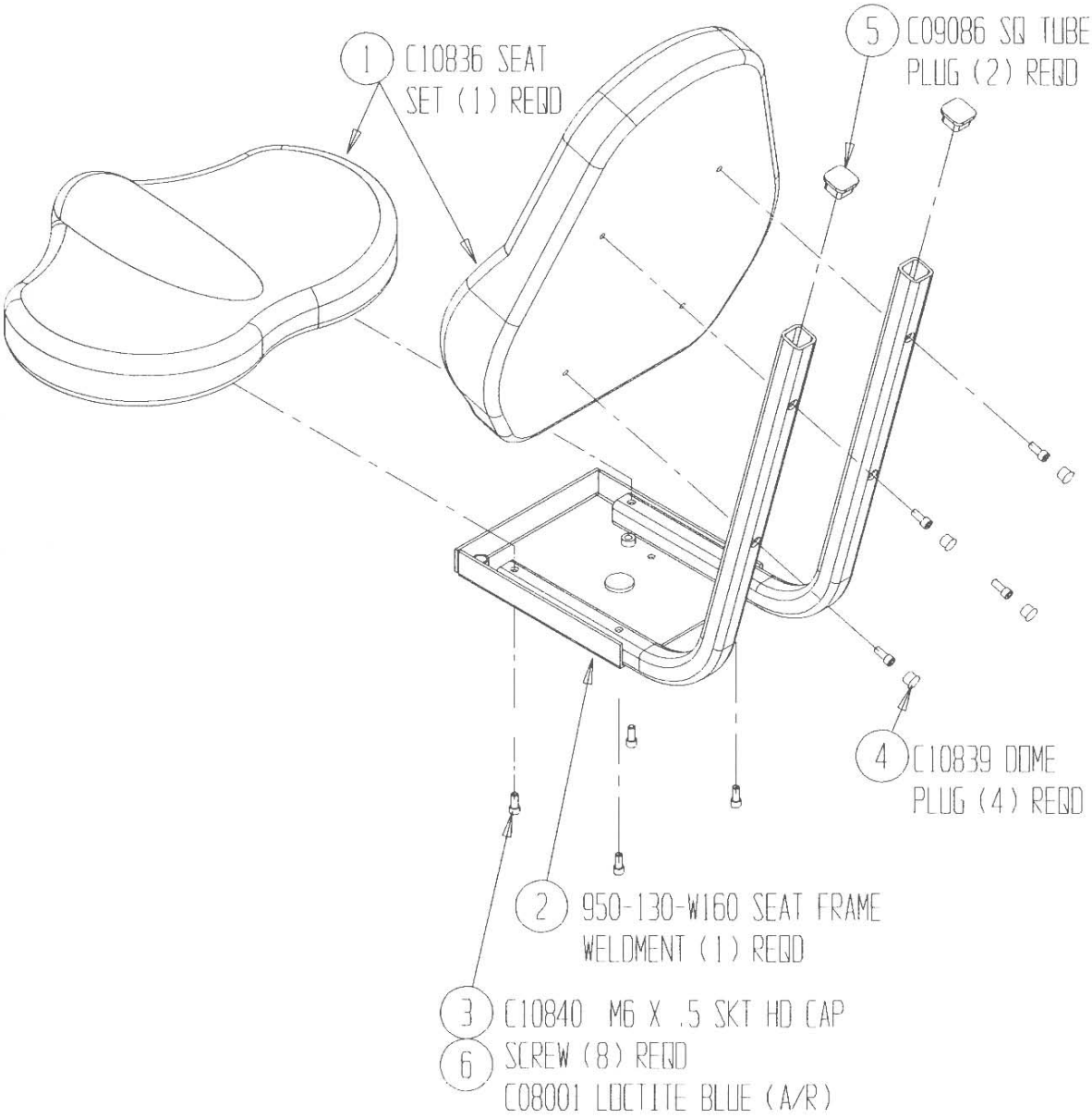

C10841 WASHER SPRING .855 OD X .650 ID (2) REQD
58
57
945-110-M451 KEY 1/8 SQ X .88 (1) REQD
C08296 WASHER FLAT 1.00 X .636 X .075 (1) REQD REF
27
56
C11233 FREEWHEEL SHIMANO SF-MX30-16T-L (1) REQD
C09013 WASHER FLAT 1.25 X .343 X .047 (1) REQD
59
C08043 WASHER LOCK 5/16 (1) REQD REF
4
55
950-140-M301 FREEWHEEL SHAFT (1) REQD
C08864 SCR HEX SOC CAP 5/16 X .75 (1) REQD
60
26
945-110-M317 BRG FLANGED .63 DIA (2) REQD REF
950-140-M202 FLYWHEEL MACHINING
53
950-120-W140 WELDMENT FREEWHEEL BRG HSG
54
145
C09010 CABLE TIE MOUNT (1) REQD
950-120-K902 KIT, STANDARD FLYWHEEL
NOTE: NOT USED ON RETRO CYCLE OPTION
DETAIL -A-
950-120-E702 FITTLINXX CABLE ASSY (1) REQD
101
102
950-120-E703 HALL EFFECT SENSOR CABLE ASSY (1) REQD
950-120-E705 THERMISTER CABLE ASSY (1) REQ'D
73
103
950-120-E700 PWR CORD CABLE ASSY (1) REQD
950-120-E706 CURRENT SENSOR CABLE (1) REQD
125
104
950-120-E704 DISPLAY SIGNAL CABLE ASSY (1) REQD
128
950-120-M107 ERGOMETER JUMPER CABLE (2) REQ'D
950-120-E701 MAIN HARNESS ASSY REF
DETAIL -D-
C08573 NUT HEX #10-24 (2) REQD
96
99
C08051 WASHER LOCK #10 (4) REQD
DRN ALT F1
BRN ALT W
VIO ALT F2
97
C08466 NUT HEX M6 (1) REQD
C08047 WASHER LOCK 1/4 (1) REQD
RED ALT OUT
C08441 NUT HEX M5 (2) REQD
98
C08051 WASHER LOCK #10 (2) REQD REF
BLK ALT GND
950-120-E701 MAIN HARNESS ASSY
DETAIL -B-
C08440 POWER RESISTOR (1) REQD REF
76
78
C08423 SCR PAN HD SEM 10-32 X .50 (1) REQD REF
94
C08425 NUT HEX 10-32 KEPS (2) REQD
95
C08189 WASHER FLAT #10 (2) REQD REF
C08423 SCR PAN HD SEM 10-32 X .50 (1) REQD REF
C08425 NUT HEX 10-32 KEPS (1) REQD REF
C08189 WASHER FLAT #10 (4) REQD
950-120-E701 MAIN HARNESS ASSY REF
DETAIL -C-
SEMI-RECUMBENT CYCLE
SRC950-120-A000-B4


SEMI-RECUMBENT CYCLE
SRC950-120-A000-B4
(140) 950-120-U501 ACOUSTIC FOAM, RIGHT SIDE
950-120-M306 ALT MTG BRKT REF
C08565 ALTERNATOR REF
945-110-M355 ALT TIMING PULLEY REF
WASHER, JAM NUT, WOODRUFF KEY
SUPPLIED WITH ALERNATOR
C08339 SCR HEX HD 1/2-13 X 2.0 REF
C08340 WASHER FLAT 1/2 REF
(130) C10831 V-BELT 6 GROOVE 24.00 LG (1) REQD
NOTE: ONLY USED ON RETRO SCCLE OPTION
C08340 WASHER FLAT1/2 REF
C08349 WASHER LOCK 1/2 REF
C08341 NUT HEX 1/2-13 REF
(132) C10842 CHAIN 43.50 LG (1) REQD
(133) NOTE: ONLY USED ON RETRO CYCLE OPTION
(134) C08360 CHAIN MASTER LINK (1) REQD
C08116 WHITE LITHIUM GREASE A/R
(27) C08296 WASHER
1.12 X .64 X .075
(1) REQD
C08192 SCR HEX HD 1/4-20 X 1.50
(1) REQD REF
C08048 WASHER FLAT1/4
(1) REQD REF
C08047 WASHER LOCK 1/4
(1) REQD REF
C08379 SCR HEX HD 5/16-18 X 2.00 REF
C08042 WASHER FLAT 5/16 REF
C08043 WASHER LOCK 5/16 REF
950-120-U500 ACOUSTIC FOAM, LEFT SIDE (139)
C09057 SCR PAN-L GRAY
10-32 X .75 LG
(10) REQD REF
(38) C08399 SCR HEX HD CAP
(46) 3/8-16 X 1.00 LG (4) REQD
C08015 WASHER FLAT 3/8 USS
REF
(129) 945-110-A410 GEAR BOX ASSY (1) REQD
NOTE: ONLY USED ON RETRO CYCLE OPTION
(135) C08338 NUT HEX 3/8-16 REF
(136) C08006 WASHER FLAT 3/8 REF
(137) C08348 WASHER LOCK 3/8 REF

BIODEX

SEAT CUSHION ASSY

SEATCUSHIONASSY950-130-A130-A



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